filled with urethane acrylate said acrylate having 0.1 % by weight of free radical photoinitiator, e.g. 4-methyl-benzophenone. While said fiber is pulled by motor 102 it is precoated inside bath 112 and after it leaves said bath through slit 108 it is exposed to stimulated ultraviolet light with the wavelength of 337.1 nanometers generated by pulsed electrical discharges between electrodes 14 and 16. Said light cures the coating.

0197 After fiber 110 is completely rewound onto core 114, motor 102 is turned off, valve 36 is closed, pump 82 pulls nitrogen back into container 30, door 26 is open and roll 104 with treated fiber 110 is unloaded.

Although some typical embodiments and methods thereof of the present invention have been discussed above, additional modifications including but not limited to gas components, arrangements of parts and processing steps will be apparent to those skilled in the art without departing from the scope of the invention as expressed in the appended claims.

CLAIMS

What is claimed is:

1. A materials processing apparatus for surface modification and/or cleaning, sterilization, disinfection, film deposition, and etching of discrete objects, powder-like substances and continuous media comprising

a treatment chamber with means for holding treated objects, means for generating stimulated light emission in a gas or a gaseous mixture capable of achieving a population inversion such as argon, neon, krypton, xenon, helium,

nitrogen, carbon dioxide, carbon monoxide, hydrogen or gaseous mixtures thereof and means for reflecting stimulated light in the direction of treated objects;

at least one gas container;

means for moving gas or gaseous mixture through the treatment chamber.

2. A materials processing apparatus according to claim 1 wherein

means for generating stimulated light emission comprising at least one unstable optical resonator and means for reflecting stimulated light in the direction of treated objects are placed inside at least one enclosure said enclosure being filled with gas or gaseous mixture capable of achieving a population inversion or being connected to a container filled with gas or gaseous mixture capable of achieving a population inversion and to means of moving said gas or gaseous mixture through said enclosure;

a window transparent to the wavelength of stimulated light generated in the enclosure is placed in the enclosure's wall opposite means for holding treated objects inside the treatment chamber.

3. A materials processing apparatus according to claim 1 wherein means for generating stimulated light emission comprise at least one unstable optical resonator.

4. A materials processing apparatus according to claim 3 wherein a non-linear crystal is installed inside an unstable optical resonator.

5. A materials processing apparatus according to claim 3 wherein an unstable optical resonator comprises two opposite concave fully reflective mirrors.

6. A materials processing apparatus according to claim 1 wherein means covered with

material that volatilizes under irradiation of stimulated photons are installed inside the treatment chamber.

7. A materials processing apparatus according to claim 1 wherein means for holding discrete treated objects or powder-like substances have perforations allowing free passage of gas or gaseous mixture around said objects.

8. A materials processing apparatus according to claim 7 wherein at a given pressure drop said perforations have sizes permitting fluidization of gas or gaseous mixture while said gas or gaseous mixture flows around powder-like substances placed onto the holding means.

9. A materials processing apparatus according to claim 7 wherein inserts preventing backward flow of powder-like substances are installed in the perforations and at a given pressure drop the sizes of orifices of said inserts permit fluidization of gas or gaseous mixture while said gas or gaseous mixture flows around powder-like substances placed onto the holding means.

10. A materials processing apparatus according to claim 1 wherein the treatment chamber is connected to a conventional plasma chamber the latter comprising a pair of electrodes connected to a power supply, or a coil connected to power supply, or a microwave guide.

11. A materials processing apparatus according to claim 1 wherein the treatment chamber is connected to at least one container filled with a reactive monomer such as allyl amine, vinyl acetate, allyl alcohol, styrene, acrylic acid, cyclooctamethylsiloxane, methacrylic acid, glycidyl methacrylate, hydroxypropyl acrylate, N-vinyl pyrrolidone, hydroxyethyl methacrylate, acrylamide.

12. A materials processing apparatus according to claim 1 wherein the object holding means have at least two cores installed on shafts and at least one of the shafts is connected to a motor said motor providing for rotation of continuous media exposed to stimulated light emission.

13. A materials processing apparatus according to claim 12 wherein the treatment chamber comprises a bath with precoating liquid said bath having means for ingress and egress of treated continuous media.

14. A materials processing method comprising the steps of:

loading discrete objects or powder-like substances onto object holding means in the treatment chamber of the apparatus according to claim 1;

evacuating the treatment chamber;

forcing gas or gaseous mixture to flow through the treatment chamber while the means for generating stimulated light emission are activated;

evacuating the treatment chamber after stimulated light emission activation has been shut off;

breaking vacuum in the treatment chamber;

unloading treated objects.

15. A materials processing method according to claim 14 including the steps of:

evacuating the treatment chamber and a conventional plasma chamber;

forcing gas or gaseous mixture through the plasma chamber and generating plasma glow there;

letting plasma activated gas or gaseous mixture to flow from the conventional plasma chamber into the treatment chamber while forcing same or another gas

or gaseous mixture to flow through the treatment chamber wherein the means for generation of stimulated light emission are activated;

evacuating the conventional plasma chamber either simultaneously with the treatment in the treatment chamber or after the treatment in said chamber has been completed.

16. A materials processing method according to claim 14 including the step of letting active monomer vapor to flow into the treatment chamber after the stimulated light emission treatment step has been completed.

17. A materials processing method according to claim 14 including the step of forcing gas or gaseous mixture to flow through the treatment chamber in such a way as to ensure fluidization of the powder-like substances placed onto the object holding means while the means for generating stimulated light emission are activated.

18. A materials processing method comprising the steps of:

loading a roll of continuous media like films, webs, cables or wires in the treatment chamber of the apparatus according to claim 12;

evacuating the treatment chamber;

forcing gas or gaseous mixture to flow through the treatment chamber while the means for generating stimulated light emission are activated and simultaneously unwinding the media roll inside the treatment chamber while continuously exposing media to stimulated light emission generated either by gas or gaseous mixture flowing through the treatment chamber, or by gas or gaseous mixture filling the enclosure installed inside the treatment chamber,or by gas or gaseous mixture flowing through the enclosure installed inside the treatment chamber;